DOCUMENT RESUME

ED 276 544 RC 015 996

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TITLE Computer Networking with the Victorian Correspondence School.
INSTITUTION Victoria Education Dept. (Australia).
PUB DATE Jul 86
NOTE 20p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Access to Education; Computer Literacy; *Computer Networks; *Computer Oriented Programs; Computer Uses in Education; *Correspondence Study; *Distance Education; Educational Equipment; *Educational Radio; Educational Technology; Foreign Countries; Program Descriptions; Program Evaluation; Rural Education; Secondary Education; Telecommunications
IDENTIFIERS *Australia (Victoria); Two Way Communications; *Two Way Radio; Victorian Country Education Project (Australia)

ABSTRACT

During 1985 the Education Department installed two-way radios in 44 remote secondary schools in Victoria, Australia, to improve turn-around time for correspondence assignments. Subsequently, teacher supervisors at Melbourne's Correspondence School sought ways to further augument audio interactivity with computer networking. Computer equipment was purchased by the Country Education Project. Modems were provided to six schools in the Mallee region and to the Correspondence School. Additional computers enabled schools to supplement their two-way radio communication with text information. Difficulties were associated with teacher and student lack of keyboard skills, the importance of interactivity, the lack of clear data transfer procedures, and the quality of the radio link. Technically, the computer network using Telecom landlines worked satisfactorily, but use was deterred by cost of landlines. The CPU-100 radio carrier was too slow. Subjective evaluation results indicated radio modem trials between Murrayville and Sea Lake High Schools and the Correspondence School continue but no additional units be purchased until improved; the Correspondence School be provided with a Level 4 facsimile machine; plans for equipment maintenance in remote locations be considered; priority be given to enable students/teachers to acquire keyboarding skills; and attention be given to developing interactive lessons using telecommunications. (NEC)

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COMPUTER NETWORKING

WITH THE

VICTORIAN CORRESPONDENCE SCHOOL

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Curriculum Branch
Ministry of Education

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Report Prepared for the Victorian Country Education Project, July 1986

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SUMMARY

In 1985 the Education Department installed two-way radios in forty-four remote secondary schools. Subsequently, teacher supervisors at the Correspondence School sought ways to further augment audio interactivity with computer networking. Computer equipment was purchased by the Country Education Project (C.E.P.) during 1985. Modems were provided to six schools in the Mallee region of Victoria and to the Correspondence School in Melbourne. Additional computers enabled schools to supplement their two-way radio communication with text information. All schools received the necessary equipment for the trial by September, 1985.

Some general difficulties have occurred using either the radio modem or the Telecom landlines. Students and some teacher supervisors lacked keyboard skills. Technically, the computer network using Telecom landlines has worked satisfactorily but use has been deterred by cost of landlines. The CPU-100 radio carrier has been too slow.

A number of recommendations have been proposed.

- Radio modem trials between Murrayville High School and Sea Lake High School, and the Correspondence School should continue but at this stage no additional units should be purchased unless an improved version of the CPU-100 is available.
- As an interim measure, it is recommended that the Correspondence School be provided with a Level 4 facsimile machine.
- Consideration should be given to plans for maintenance of equipment and hardware in remote country schools.
- Priority must be given to acquire sufficient computers to enable teachers and students to acquire keyboarding skills.
- Attention should be given to developing interactive lessons using telecommunications.

1. Introduction

1.1 Preamble

Most secondary children enrolled in the Victorian Correspondence School -- the main provider of distance education for school-age children in Victoria -- attend small, remote secondary schools throughout the State. Subjects unobtainable in local schools become available through the Correspondence School.

Until recent years, most Correspondence School instruction was print based; some supplementary audio material was provided on cassette. However during the last twelve months, the staff of both the primary and secondary Correspondence School have experienced some interest in using communication technology in distance education. In the first instance, the Education Department installed two-way radios in forty-four remote secondary schools. Audio interactivity augmented print.

Subsequently, teacher supervisors sought ways to further augment interactivity using visual media. Additionally, turn-around time for assignments between the Correspondence School and remote students would be reduced, enabling students greater feedback on earlier work and consequent self-confidence to proceed to new work.

A further enhancement, the provision of computer equipment was initiated by the Country Education Project (C.E.P.) during 1985. Modems were provided to six schools in the Mallee region of Victoria and to the Correspondence School in Melbourne. Additional computers enabled schools to supplement their two-way radio communication with text information. Stage 1 of this project established the network (See Appendix A). This was seen as a natural extension of the C.E.P. Two-way Radio Project (Conboy: 1983). Stage 2 intended to extend the project to all Correspondence School subjects and investigate using a radio-modem as well as the landlines to transfer text.

1.2 Installation

All schools received the necessary equipment for the trial by September, 1985 (See Appendix B). Early warnings by the supplier, Astro Pty Ltd, that dedicated lines separate from the existing school system would be necessary proved correct and these were installed in each of the locations.

1.3 Evaluation methodology

Because of the small number of teachers and students involved in the project, information was collected by a series of unstructured interviews. The assessment of the computer link is based on subjective opinion; no presupposition of "predictive" or other scientific attributes has been applied to the data. One evaluative visit was made in June 1986 to Murrayville, Sea Lake and Hopetoun High Schools; and principals and teachers involved with the computer trials were interviewed (See Appendix C).

2. Frequency and Type of Use of the System

Telecommunication using telephone or radio carriers has not been used extensively. In late 1985, some assignments in music, history and mathematics were transferred to the Correspondence School. These were typed using word processors. Some difficulty was experienced by students because of lack of familiarity with programs, poor keyboarding skills and difficulty with obtaining appropriate mathematical symbols (See Appendix D).

Teachers were mainly responsible for transmitting the files to the Correspondence School. Several teachers commented that because they were slow using communication software, telephone charges were high; consequently the teachers felt doubt about giving such responsibility to students. The timing of the trials, late in 1985, meant that some students were concentrating on examinations and were not prepared to spend additional time learning the word processing program or typing assignments. In addition, the small number of students involved in correspondence classes in the five schools reduced the potential for using the link. For example, in 1985 Ian Bolster, a teacher at Sea Lake High indicated that the computer link has not been very valuable for Sea Lake High School. The school had two students doing correspondence classes: one Year 11 religious studies and one Year 12 English literature student. A further difficulty occurred at Manangatang Higher Elementary School where the accountancy student was behind in assignments and did not have spare time available to be trained in Appleworks. Hopetoun High School had a further difficulty when their Apple Europlus and Apple IIc computers would not run the Apple Access program.

Because of the minimal use of the equipment, the project has virtually become a technical trial. No discernible difference in educational outcomes was perceived although some conclusions made by teachers have educational ramifications and are recorded.

3. Educational effectiveness of computer links between the schools and the Correspondence School

The small number of transfers have made little impact on the educational achievement of the students. Barry Duggan, Principal of Hopetoun High School, suggested that the transfer process has limited effectiveness and what is required is visual content as well as computer data.

The difficulties associated with transferring computer data are discussed below.

3.1 Teacher and student lack of keyboard skills

All teachers interviewed indicated that one of the main limitations affecting telephonic data transfer was lack of keyboard skills. By contrast, Warwick Matthews, a teacher at Ouyen High School in 1985, indicated that one of the main advantages of facsimile transfer was that it did not require typing skills (See Appendix E). Peter Nutthal, the correspondence supervisor at Hopetoun High, indicated that one difficulty is time necessary for students to input material into the word processor programs. Ian Bolster also suggested that students see little value in doing their work on the word processor. "At present, the [telephonic data transfer] system only saves one day, as the mail only takes one day to deliver from Melbourne to Sea Lake." Jenny Lloyde, a student at Murrayville High in 1985, suggested that keyboarding skills are very important to the computer link.

Insufficient keyboarding skill among staff at the Correspondence School is a limitation upon using telephonic transfer; this problem is exacerbated in subjects such as English where considerable keyboarding skill would be required.

3.2 The importance of interactivity

Several teachers commented on the importance of the Correspondence School using modern technology for interaction rather than simply for communication. Barry Duggan suggested that in order to make the learning experience exciting, the Correspondence School should continue to be proactive in its use of technology. The only interactive exchange has been

"chat" sessions with the keyboard consisting, usually, of informal communication. Some questioning of the value of using this computer technology simply for data transfer has occurred. Ian Bolster feels that there is a need to set up parallel communications with audio- and data transfer available simultaneously. "We are using it as an electronic mail bag just to see if the technology is viable, but eventually you want the immediate interaction. You might just as well use the mail."

Paradoxically, one of the areas where telephonic data transfer can be used in distance education is in mathematics and similar problem-solving areas. Keyboarding requirements are relatively low, and the teacher could set a problem and monitor the student working through it at the remote location. However, the insufficient mathematical symbols on standard keyboards makes transfer of mathematical information difficult (See Appendix D).

Ian Bolster suggested that an interactive computer program involving both the student in the school and the teacher/supervisor at the Correspondence School would be the best use of the computer network. He felt that students would respond more favourably to interactive use of telephonic transfer. "If you had an interactive teacher program written, you could have a kind of interactive game with two players, one the Correspondence School teacher and the other, the student. The teacher will use a computer, and interact with audio on two-way radio." This idea is technically functional when used with a landline and eventually should become technically functional when used with a radio modem; however, the idea is not educationally functional in the opinion of these students.

3.3 The need for clear procedures for data transfer

One of the shortcomings exposed in the trial was a lack of clear guidelines about how the isolated schools and the Correspondence School were to employ data transfer. Shirley Lanfranchi, a teacher at Murrayville High School indicated two requirements in this area. "There has to be more communication between the students and the Correspondence School to encourage the students to do their work in this manner. Secondly, the Correspondence School must give guidelines about how they want us to present the work coming over on the file." Simple procedures such as identifying corrections when they appear on a computer printout have to be developed. In the English faculty, corrections on student work are colour coded according to the type of alterations made and the computer link with its one colour printout represented a substantial change in procedures.

3.4 Some dissatisfaction with the radio link

There is some concern that the sound quality of the radio is not sufficiently good enough to make it anything but a supplementary communications system. Ray Clifford, a teacher at Manangatang Higher Elementary School, indicated that the radio link has been a white elephant in the school.

4. Constraints specific to the CPU-100 radio modem

4.1 Slow transfer speed

As noted above, telephone data transfer, whether using landlines or radio modem, has certain limitations. Moreover, there are some technical difficulties specific to the radio modem.

Commenting on the effectiveness of the CPU-100 modem, Shirley Lanfranchi indicated that "I have only seen it working in trial stage; it is very slow. It would not be effective for transmitting students' work because of the time involved. A short three sentence file could

take up to ten to fifteen minutes to be transferred. An A4 page could take 20 minutes, depending on the reception. If it is clear, we received it faster, but not significantly."

Ian Bolster also indicated that although the CPU is a good unit and easy to use, it is too slow. "During the Latrobe conference (Curriculum Victoria), even though the radio reception was clear, the CPU unit was having trouble transmitting the information. This is partly due to its error correcting process. If it detects an error in one sentence (even though it may be only one letter), it will retransmit the whole sentence and go on re-transmitting until it comes through error free. For some student work such as essays, you don't need perfect transmission but for other work, such as accounting, you require accuracy. Some way of automatically adjusting the accuracy would be a good idea."

The manufacturer is modifying the modem to send data in very short bursts when the reception is poor. By doing this, there is a greater chance of getting information through accurately. When conditions are favourable, it will transmit in longer bursts and provide faster transmission.

"On the Murrayville conference, we had a two hour session chatting back and forth and the net result was one A4 page. There were times when a very short sentence such as Hullo Ian, would take five minutes to get through."

He suggested that another possibility for tranferring assignments could be using the electronic mail component of a large database. "In that case, somebody could pay for the annual rental for the whole State and all the schools would be charged 008 rates."

4.2 Administrative difficulties

In terms of expanding transfer facilities, if a large number of schools attempted transfers simultaneously, creating peak-use times, there would be bottlenecks at the Correspondence School. For example, students usually send assignments to the Correspondence School on Fridays. However, during the day the radio frequency is used for lessons.

5. Other Possible Educational Attributes of Telecommunications and Data Transfer

5.1 Access to databases

Establishment of telecommunications links has the side benefit of allowing schools to access other databases. For example, night classes can be run in rural economics and can access AGTEX, the Department of Agriculture database.

5.2 Interschool communication

Ray Clifford indicated that the greatest potential for telecommunication and radio carriers is in interschool communication. "There is a lot of material that is at present being transferred by hand. There is concern about the costs of telephone lines and if the radio can be used, this will reduce costs significantly." However, although the system has potential for this, it has not been realised.

6. Maintenance and inservice education requirements.

Additional provision will have to be made for maintenance and servicing equipment and hardware. Very little expertise exists in small country towns, and teachers cannot be expected to undertake complex repairs. Isolated schools in particular, suffer delays in

relation to equipment maintenance: for example, Murrayville High School's photocopiers are maintained from Horsham, approximately 350 kilometres from the school.

Inservice education is a particularly important issue. Small schools are particularly vulnerable to loss of expertise through staff turnover. This happened at Hopetoun High School in 1985: two staff members concentrating on all aspects of computers in the school left. Principal Barry Duggan indicated that although there were adequate computer inservice activities in his region, the activities were probably less effective for his school than for larger schools. For Hopetoun, inservice activities should be directed towards the whole staff (rather than towards specific groups) so that everyone gains necessary expertise. Moreover, such a tactic could reduce the reticence of a few staff who are reluctant to use new technology.

7. Conclusion

Innovations in interschool communication must be seen in the context of changes occurring in schooling in both administration and curriculum content. Reports such as Ministerial Review of Postcompulsory Schooling ("The Blackburn Report") and discussion papers such as "Taking Schools into the 1990's" well have an inevitable influence on distance education in Victoria. Plans to develop public sector "pipe lines" to handle voice and data communication throughout the State will also have a bearing on the efficiency of various telecommunications systems.

Principals interviewed indicated that the Correspondence School was important in increasing the options available for their students. This was particularly important up to Year 11. Mike Nihill, Principal of Sea Lake High School suggested that the Correspondence School courses enabled students to stay on in the school at least to Year 11. Other solutions such as school clusters and networks are being planned to increase retention rates. From the present 25% to 30% retention at Year 12, the Blackburn Report recommends a retention of 70% by 1995 (Ministerial Review of Postcompulsory Schooling, 1985, 63).

A general aim to the Correspondence School's interactive immediacy by using telecommunications links has been favourably received in the schools. All three principals reiterated the importance of the Correspondence School to the education of students attending remote secondary schools. However, there is evidence to suggest that the Correspondence School's initiatives in telecommunication have proceeded beyond student's current computer expertise.

While telephonic transfer of student assignments has been technically successful, the high cost of STD calls to remote schools has prevented extensive use of this facility. Thus, using radio carriers to transfer the same information-- free of trunk costs-- has considerable attraction. However, based on the observations of the two teachers heavily involved in the trial, Shirley Lanfranchi of Murrayville High School and Ian Bolster of Sea Lake High School, the transmission speed is currently too slow to consider extending this system. The willingness of the manufacturer to modify the radio modem will help to overcome transmission difficulties. The enthusiasm and diligence of Bram Moore, Jim Pollet, and Dr Dinesh Srivastava of the Correspondence School and Shirley Lanfranchi and Ian Bolster in the Mallee schools further suggests that the trials should continue.

Recommendations

7.1 Radio modem trials between Murrayville High School and Sea Lake High School, and the Correspondence School should continue but at this stage no additional units should be purchased unless an improved version of the CPU-100 becomes available. The radio

modem's slow transmission reduces its effectiveness. Nevertheless, the equipment is produced in Victoria, and the manufacturer has been cooperative in offering advice and assistance to staff of the Correspondence School. Further, modifications to improve the modem's efficiency are underway, and these should be tested.

7.2 As an interim measure, it is recommended that the Correspondence School be provided with a Level 4 facsimile machine. This machine enables pages to be stored and transmitted to precoded telephone numbers. This would enable it to transmit pages of information to schools during non-peak times. Smaller facsimile machines are currently being installed in the five Mallee Track schools.

7.3 Consideration should be given to plans for maintenance of equipment and hardware in remote country schools. Schools will become increasingly more dependent on the equipment and it is unlikely that local expertise will be available to effect repairs. Unfortunately, teachers can do little more than rudimentary preventative maintenance. Consequently, spare machines must be available to prevent extensive disruption to educational programs.

7.4 Ultimately, the effective use of computers as communication devices depends (at least in the immediate future) upon teachers and students acquiring keyboard and wordprocessing skills. At Year 7 students must acquire these skills, and staff should use computers to compile lesson plans, maintain records and transmit files to other locations. Priority must be given to acquire sufficient computers to these requirements.

Attention should be given to developing interactive lessons using telecommunications along the lines suggested by Ian Bolster (see Section 3.2 above). A review of available software programs should be undertaken by State Computer Education Centre to determine whether distance education programs which build in a role for a supervisor as well as the student exist.

Consideration should be given to applying the new principal technology as outlined in the Information Systems Strategic Plan in distance education (Information Systems Strategic Plan, 1985). Data could be transferred between the Correspondence School and the remote schools using an electronic mail function envisaged by the Strategic Plan. This recommendation is strengthened by the proposed relocation of part of the Information Systems Section and the Correspondence School to the Brunswick location.

8. References

Conboy, Ian: *Two-way Radio in Schools*. Country Education Project, Melbourne, 1983.

Education Department of Victoria: *Report of the Ministerial Review of Postcompulsory Schooling*. *Volume 1*, Melbourne, 1985.

Pogson, M.J. & Ralston, A. B.: *Information Systems Strategic Plan, Recommendations*. Education Department of Victoria, Melbourne, 1985.

MEMO : 23 OCT 85. APPENDIX A.
TO : PRINCIPAL.
FROM : J. Pollet, B.Moore, D.Srivastava.
SUBJECT : STAGE 2. MALLEE-TRACK-PROJECT. (1986)

A. REVIEW OF STAGE 1 (1985)

B. AIMS AND BUDGET OF STAGE 2 (1986)

A. REVIEW OF STAGE 1 (1985)

During the first stage of the pilot project, network and procedures were established. Computer-contact between schools was established. Student work was transmitted in a number of subjects.

- Participants : C.S, Ouyen, Sea Lake,
Hopetoun, Murrayville, Manangatang.

- ACHIEVED IN 1985 : (see details in relevant reports)

(a). Establishment of network and procedures.

(b). In-service training of staff and students.

(c). Terminal-mode communication.

(d). File-transfers, mainly student-work and correction.

B. STAGE 2 :

This stage should be viewed mainly as a "Consolidation period, but it could also become a period of "popularization."

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PURPOSE OF STAGE

(e). To increase volume and reduce turn-around time.

(f). Extension of these facilities to all subjects.

In order to achieve the above, the following aims are set.

- AIM 1 : To establish the network on Radio, thereby eliminating the excessive cost of using the telephone as carrier. This can be achieved by using a CPU-100 radio-modem.

- AIM 2 : To make the system flexible, and thus more efficient, by turning the Correspoondence School Computer-Station into a mail-box, available to other schools, even after hours.

  This can be achieved by using Cross-Talk, an automatic communications software package (one in each school), a Hard Disk Drive, Ram Card, and a Clock Card at the C.S.

  The "cabling" (including black-box) and intelligent cables will help to download files received in the letter-box into other computers and printers.

- AIM 3 : To overcome the resistance of some teachers against the new technology by proving that this technology can be useful even in subjects like English.

  This can be achieved by the introductrion of 'Facsimile" units in the C.S., and the schools of the Mallee Track.

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ANTICIPATED BUDGET :

Items needed, and approximate cost :

CPU-100 Radio-Modems. (1 x 6)	6000. 00
Cross-Talk. (1 x 6)	1500. 00
Hard Disk Drives, 20 megabyte. (1 x 2)	8000. 00
Uni-Disk Drives, 800 kilobytes. (1 x 2)	1200. 00
Clock-Card. (1 only).	450. 00
Cabling and Interfacing.	500. 00
Facsimile Units (1 x 6)	18000. 00
	35650. 00

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APPENDIX B.

COUNTRY EDUCATION PROJECT.

TO PRINCIPAL.
FROM: D.Srivastava, J.Pollet, B.Moore.
SUBJECT: PROGRESS REPORT.
DATE: SEP.30.85.

Structure of Report.

(A). Setting up System.
(B). Process of student work electronically.
(C). Assessment of project.
(D). Future Plans.

(A). The following stages of (A) have now been implemented.

(i). Installation of hardware.
(ii). Training of staff in use of software.
(iii) Computer net-work.

(i). INSTALLATION.

The six schools involved in this project received the necessary hardware from Astro Pty Ltd as contracted.

In terms of actually installing the system it should be emphasised that a great deal of time was spent both here, and at country schools in actually setting the system up.

A mild warning by the supplier that dedicated lines might be needed turned into a certainty. Clearly the system could not operate satisfactorily without direct lines, as any switchboard activity kept crashing the system in an unpredictable manner.

Schools therefore realized they had to outlay extra expense to overcome this problem. Since this has been accomplished there have been no problems with hardware, either here or in the country.

(ii). IRAINING.

The training of staff in the use of software and hardware is proceeding apace, but will take some time, due in part to unfamiliarity with the new technology. However, there are now two or more modem operators located

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at each school, who can efficiently transmit or receive work by computer.

(iii). COMPUTER NETWORK.

All schools are actively using the system on a regular basis, and subjects such as Maths, History, English, and French are being sent, and returned within a matter of hours or days.

Country schools within the network are also making extensive use of the computer in exchanging information between themselves, thereby achieving a closer liason than hitherto possible.

(B). PROCESSING OF STUDENT WORK ELECTRONICALLY.

At present the volume of work being sent in this manner is not extensive, but is sure to increase considerably as staff and students become familiar with hardware and software. The quality of work being transmitted at present is good, and students are developing skill in handling word processors.

(C). ASSESSMENT OF PROJECT.

The project at this point in time is functioning smoothly, and computer-connect time has been reduced to a mimimum. This has been brought about mostly by sensible use of the radio, so that the computer is used only for transferring or receiving files. On those occasions radio reception has been poor, the computer has provided a means whereby information can be exchanged, particularly in hardcopy.

(D). FUTURE PLANS.

It is intended to set the system up in such a way that it can be accessed automatically. This will enable files to be uploaded or downloaded without an operator being present for the exchange. Such a service would enhance the system since it would allow schools to make contact at a time of their own choice, rather than having to book or ring in advance.

Perhaps more exciting is the thought of linking the computer to the radio. We have already made inquiries into the feasability of doing this, and so far the prospects look promising. The RACV is using this method on a large scale with a great deal of success, as is the Country Road Authority.

If it is possible to do this, the cost of computer-connect time is not a critical factor, thereby allowing full interaction between computer and student without restraints

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APPENDIX C

List of Personnel Interviewed

	Principal	Staff
Correspondence School, Melbourne		Dell Bell Glenda Davis John Lansden Bram Moore Jim Pollet Maureen Russell Dinesh Srivastava
Hopetoun High School	Barry Duggan	Peter Nuthall Rob Craven
Murrayville High School	John Schreenan	John Harley Ena Lackmann Shirley Lanfranchi Rod Ziems Jenny Lloyde-student
Manangatang Higher Elementary School		Ray Clifford
Sea Lake High	Mike Nihill	Ian Bolster Alan Marshall

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EX 14.8 N M M 5 P168

JEANNETTE LLOYDE 5640

SYMBOLS \/ = SQUARE ROOT
^ = RAISE ^ TO THE POWER OF 2
Q = THETA

1.
SINQ=\/3/2
SINQ=1.732/2
SINQ=.8660
Q=60

2.
COSQ=1/2
COSQ=.5000
Q=60

3.TAN Q = 1/ \/3
TAN Q =.5774
Q = 30

4.COT Q = \/3
COT =1.7321
Q = 30

5. SEC Q = 2/ \/3
SEC Q =1.1547
Q = 30

6. COSEC Q = -2
1/SIN Q = -2
SIN Q = -0.5
(SIN IS NOT NEGATIVE IN THE FIRST QUADRANT)

7. 4 COS Q = 2
COS Q = 2/4
COS Q = 0.5
Q = 53 14

8. \/3 TAN Q = 1
TAN Q = 1/ \/3
TAN Q = .5774
Q = 30

9. \/3 COT Q = -1
COT Q = -1/ \/3
COT Q = -0.5774
Q = 30

10.2 SEC Q = -4
SEC Q = -4/2
SEC Q = -2

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APPENDIX E.

Bram Moore.
Jim Pollet.
Re letter 23/9/85. 30/9/85.

Dear Sysops,

I have received Ian Bolster's guide (part 1) and I am looking forward to part 2 .I presume a similar "idiots guide" will be made available for the crosstalk program and automatic file repository?

I assume that you are aware of the difficulties associated with maths symbols and diagrams when you ask for more student's work to be sent down. At present any work that we send down could NOT be used for correction purposes!

Have you considered the use of FAX transmission rather than word processor files? I feel that such a system would offer some positive benefits -

a) Students can complete work at home or at school.

b) No typing skills are necessary.

c) Diagrams and symbols can be easily accommodated.

d) No doubling up of students time is required, as against hand written copy which is currently being typed in as input.

e) Turn around would be just as rapid, in fact quicker than at present.

Such a system would avoid the postal system (is this the major factor in turn-around time?) but would be similar to the present system in terms of quality of input.

I have thought seriously about the Apple Super Pilot concept and I can see merit on it. I would particularly see the use of it as a basis of a tutorial system rather than as a set/correct system. I feel that Coro students suffer most when they cannot understand a concept. A system of partial solutions to problems and interactive tutorials would greatly alleviate this problem. In maths and science it is often the misunderstanding of a diagram, or the inability to construct one that caused difficulty. A 'super pilot' based system of such 'helpful hints' would be great!

The whole concept of communication through computers will not succeed if the current STD rates are

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applied to modem transmission. Small schools cannot finance the regular use of modems when the postal system is such a low-cost alternative. The concept of radio-modems would get around what is a significant financial barrier.

I have heard of a video-based teaching system which allows students to see and hear the teacher and teachers to hear the students. This type of correspondence network may be prohibitively expensive but it sure beats the present system! Any chances of trialling it?

Yours sincerely,

Warwick Mathews.

Received by MODEM.
Ouyen H.S.
MON.30.SEPT.85.
TIME: 4.00.PM.

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